Illinois Commerce Commission
Grid Planning Workshops
Proposed Discussion Topics

Due Date: By 5:00 pm on Friday, January 7, 2022

Purpose: The purpose of the Illinois Commerce Commission (ICC) Grid Planning (GP) Workshop process is to establish an open, inclusive, and cooperative forum regarding utilities' distribution planning and investments. Pursuant to 220 ILCC5/16-105.17(e)(2), This workshop process is designed to achieve the following objectives:

A. review utilities' planned capital investments and supporting data;
B. review how utilities plan to invest in their distribution system in order to meet the system's projected needs;
C. review system and locational data on reliability, resiliency, DER, and service quality provided by the utilities;
D. solicit and consider input from diverse stakeholders, including representatives from environmental justice communities, geographically diverse communities, low-income representatives, consumer representatives, environmental representatives, organized labor representatives, third-party technology providers, and utilities;
E. consider proposals from utilities and stakeholders on programs and policies necessary to achieve the objectives in subsection (d) of this Section;
F. consider proposals applicable to each component of the utilities' Multi-Year Integrated Grid Plan filings under paragraph (2) of subsection (f) of this Section;
G. educate and equip interested stakeholders so that they can effectively and efficiently provide feedback and input to the electric utility; and
H. review planned capital investment to ensure that delivery services are provided at rates that are affordable to all customers, including low-income customers.

ICC GP Workshop participants are invited to submit topics they propose for discussion among the workshop participants during the workshop process.

Submitting Proposed Topics:

- Workshop participants are encouraged to fill out as much information as possible in this template.
- The ICC GP Workshop Facilitator may follow-up with the submitting participant and request additional information after templates are received. Workshop participants that submit feedback may be invited to present at an upcoming workshop meeting.
- **Please email the completed template, with any supplemental materials that are necessary, to the GP Workshop Facilitator: (ben@enernex.com) no later than 5:00 pm on Friday, January 7, 2022.**
- Unless a party requests confidential treatment, all submittals will be posted on the ICC Multi-Year Integrated Grid Plan Workshops website.

Submitter Contact Information

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Question Categories

Please check each applicable box below to identify the applicable utility/utilities.

Check	Illinois Utility Impacted
☒	Ameren Illinois
☒	ComEd

Check	PA 102-0622 identifies various objectives and requirements for GP, including the those listed below. Please identify the objectives and requirements to which the proposed topic is related.
☒	1) Coordination of the State's renewable energy goals, climate and environmental goals with the utility's distribution system investments, and programs and policies over a 5-year planning horizon to maximize the benefits of each. (220 ILCS 5/16-105.17(d)(1))
☒	2) Ensuring utility expenditures are cost-effective. (220 ILCS 5/16-105.17(d)(1))
☒	3) Optimizing utilization of electricity grid assets and resources to minimize total system costs (220 ILCS 5/16-105.17(d)(2))
☒	4) Efforts to bring the benefits of grid modernization and clean energy, including, but not limited to, deployment of distributed energy resources, to all retail customers. (220 ILCS 5/16-105.17(d)(3))
☐	5) Efforts to bring at least 40% of the benefits of grid modernization and clean energy to Equity Investment Eligible Communities. (220 ILCS 5/16-105.17(d)(3))
☐	6) Enable greater customer engagement, empowerment, and options for energy services. (220 ILCS 5/16-105.17(d)(4))
☒	7) Reduce grid congestion, minimize the time and expense associated with interconnection, and increase the capacity of the distribution grid to host increasing levels of distributed energy resources, to facilitate availability and development of distributed energy resources, particularly in locations that enhance consumer and environmental benefits. (220 ILCS 5/16-105.17(d)(5))

Check	PA 102-0622 identifies various objectives and requirements for GP, including the those listed below. Please identify the objectives and requirements to which the proposed topic is related.
☒	8) ensure opportunities for robust public participation through open, transparent planning processes. (220 ILCS 5/16-105.17(d)(6))
☒	9) Provide for the analysis of the cost-effectiveness of proposed system investments, which takes into account environmental costs and benefits. (220 ILCS 5/16-105.17(d)(7))
☒	10) To the maximum extent practicable, achieve or support the achievement of Illinois environmental goals, including those described in Section 9.10 of the Environmental Protection Act [415 ILCS 5/9.10] and Section 1-75 of the Illinois Power Agency Act [20 ILCS 3855/1-75], and emissions reductions required to improve the health, safety, and prosperity of all Illinois residents. (220 ILCS 5/16-105.17(d)(8))
☒	11) support existing Illinois policy goals promoting the long-term growth of energy efficiency, demand response, and investments in renewable energy resources. (220 ILCS 5/16-105.17(d)(9))
☒	12) Provide sufficient public information to the Commission, stakeholders, and market participants in order to enable nonemitting customer-owned or third-party distributed energy resources, acting individually or in aggregate, to seamlessly and easily connect to the grid, provide grid benefits, support grid services, and achieve environmental outcomes, without necessarily requiring utility ownership or controlling interest over those resources, and enable those resources to act as alternatives to utility capital investments. (220 ILCS 5/16-105.17(d)(10))
☐	13) Provide delivery services at rates that are affordable to all customers, including low-income customers. (220 ILCS 5/16-105.17(d)(11))
☒	14) Review utilities' planned capital investments and supporting data. (220 ILCS 5/16-105.17(e)(2)(A))
☐	15) Review how utilities plan to invest in their distribution system in order to meet the system's projected needs. (220 ILCS 5/16-105.17(e)(2)(B))
☒	16) Review system and locational data on reliability, resiliency, DER, and service quality provided by the utilities. (220 ILCS 5/16-105.17(e)(2)(C))
☒	17) Solicit and consider input from diverse stakeholders, including representatives from environmental justice communities, geographically diverse communities, low-income representatives, consumer representatives, environmental representatives, organized labor representatives, third-party technology providers, and utilities. (220 ILCS 5/16-105.17(e)(2)(D))
☒	18) consider proposals from utilities and stakeholders on programs and policies necessary to achieve the objectives in subsection (d) of this Section. (220 ILCS 5/16-105.17(e)(2)(E))
☐	19) consider proposals applicable to each component of the utilities' Multi-Year Integrated Grid Plan filings under paragraph (2) of subsection (f) of this Section. (220 ILCS 5/16-105.17(e)(2)(F))
☒	20) educate and equip interested stakeholders so that they can effectively and efficiently provide feedback and input to the electric utility. (220 ILCS 5/16-105.17(e)(2)(G))
☐	21) review planned capital investment to ensure that delivery services are provided at rates that are affordable to all customers, including low-income customers. (220 ILCS 5/16-105.17(e)(2)(H))

Topic: Determining the role of the thermal generation fleet during the clean energy transition (i.e., integrated resource planning).

1. **Describe the Topic.** – As currently planned, the Integrated Grid Planning (IGP) process and workshops focus on topics such as integrated distribution planning, non-wires alternatives (NWA), energy storage resources, and distributed energy resources (DER), and the planning horizon is limited to 5 years. While these topics are vital for modernizing the grid and enabling higher levels of renewable energy, additional topics must be considered to achieve Illinois' clean energy goals while maintaining reliability and affordability. To ensure that Illinois' energy and environmental goals through 2050 are achievable, it would be prudent for integrated grid planning to consider similar longer-term horizons. Specifically, greater attention should be given to determining the role of thermal generation resources (e.g., coal, natural gas, and nuclear power plants) in achieving these goals over the next several decades. These resources can promote integration of variable renewable energy resources by providing dispatchable power. Furthermore, highly flexible thermal resources with low minimum operating levels, such as reciprocating engines, can effectively regulate their output to maximize renewable energy penetration. Overall, careful resource planning decisions (e.g., when to retire and/or build new generation resources) can help accelerate the least-cost transition to a renewable/sustainable energy system. Nevertheless, there are many questions and concerns regarding thermal resources. For example, it is widely agreed that coal-fired power plants carry the greatest emissions burden and that retiring/replacing such resources as soon as possible can yield significant carbon reduction benefits. Natural gas and nuclear are often thought of as bridge fuels for the renewable energy transition, yet questions persist, such as whether nuclear operating licenses will continue to get extended and if gas-fired resources will become stranded assets or can transition to operate on sustainable fuels like green/pink hydrogen. As such, initiating a dialogue to address these potential benefits and concerns would make the IGP process more robust and facilitate decarbonization.

   To offer Wärtsilä's perspective on the role of the thermal fleet in promoting the renewable energy transition, Wärtsilä has modeled over 100 power systems worldwide using state-of-the-art capacity expansion and production simulation modeling tools. While these systems are vastly different in many ways, Wärtsilä's modeling studies reach similar conclusions regarding the strategies necessary or achieving a cost-optimal transition to a 100 percent clean energy system (see link referenced in "Sources" section). The main conclusion is that adding renewable energy resources to the grid is paramount. However, these renewables additions must be supplemented by replacing aging, inflexible, and inefficient thermal resources with more flexible and efficient ones designed with sustainable fuel (e.g., green/pink hydrogen) conversion capabilities. This vision could be discussed in greater detail during a future workshop. Although Wärtsilä has not yet modeled Illinois' power system, the hope is that discussing the topic of the role of the thermal generation fleet during the energy transition with the Utilities (Ameren Illinois, "Ameren" and Commonwealth Edison, "ComEd") and all other interested stakeholders can foster a more comprehensive planning process.

2. **Identify any aspects of this topic you would like the participants to discuss more specifically, rather than generally.** –

   - **Integrated Resource Planning** – Currently, an integrated resource planning process (one that considers current and planned electricity generation over the next 20 – 30 years) either does not exist for the Utilities or lacks transparency and public engagement opportunities. More insight from Ameren and ComEd as to how these planning and investment decisions are made would increase transparency and could promote sounder decision making. For example, it would be incredibly beneficial to discuss the economic and operational assumptions the utilities make when deciding to retire existing resources as well as determining when to build new ones and what technologies are best suited to provide the least cost solution for ratepayers.

- **Grid Flexibility** – Grid flexibility will be critical for maximizing the integration of variable renewable energy resources. As increasing levels of variable renewable energy are added to the grid, other resources, e.g., storage, hydropower, thermal, must be able to respond to instantaneous changes in net load through fast-ramping/cycling, starting, and stopping. To the extent that thermal resources are relied upon to provide flexibility, grid operators should strive to dispatch the resources best suited to meet these needs. For example, whereas gas turbines face added maintenance and fuel costs due to cycling and starting/stopping, reciprocating engines face no such restrictions, and can start, stop, or ramp between 0 to 100 percent load within 5 minutes. Such flexibility allows balancing of variable renewables, thereby minimizing renewable energy curtailment. Additionally, as variable resource penetration increases, so too will the need for resources that are fast and flexible enough to respond to real-time price variability. Resources that are able to respond to real-time price spikes from variable output can be used to hedge price risk and reduce overall costs to ratepayers.

- **Grid Reliability** – Grid reliability will become increasingly important during the transition to a fully decarbonized power sector. Growing reliance on renewable energy resources like solar, wind, and hydro power are resulting in an increasing dependence of generation and load on weather. Furthermore, more frequent and intense extreme weather events, such as heatwaves and winter storms, can have significant impacts on electricity supply and demand. These risks underscore the need for sources of clean, dispatchable power that can support system need over the course of single and multiday day weather events or seasonal energy shifting needs.

- **Affordability** – The affordability impacts of decarbonization must be considered. While renewable energy resources are becoming increasingly cost competitive with conventional thermal resources, many studies[1] have found that the marginal cost of abating power sector emissions grow substantially for the final 10 – 20 percent of emissions. However, Wärtsilä's power system modeling studies consistently show that flexible thermal resources capable of operating on sustainable fuels can provide this final piece of the decarbonization puzzle without compromising affordability.

- **Hydrogen/Sustainable Fuels** – Sustainable fuels like hydrogen produced from either nuclear or renewable energy are receiving increasing attention at the national and international levels. According to Wärtsilä's power system models, transitioning thermal (gas) resources to run on sustainable fuels, such as green hydrogen or synthetic (carbon-neutral) methane can provide a low-cost decarbonization pathway.

3. **Describe the benefits that could be generated related to this topic.** – Determining the role of the thermal generation fleet poses numerous benefits. From a resource planning perspective, using optimization modeling to guide decisions for the thermal fleet can minimize total system costs, accelerate emissions reductions, and satisfy Illinois' long-term renewable energy goals. Co-optimizing distribution system investments will ensure that utility investments and expenditures are cost-effective and that the benefits of clean energy and grid modernization are maximized. At the same time, thermal resources can promote reliability and resiliency to the extent that they are dispatchable and operationally flexible. Overall, this topic would be suitable for broader discussion because building such long-term plans and models are most effective when there is transparency and stakeholder participation.

4. **Describe any challenges related to this topic, including challenges related to balancing this topic against other GP topics.** – From a public perspective, continued use of thermal resources is often viewed as undesirable; oftentimes, education is required to understand the unintuitive concept that thermal resources can accelerate the renewable energy transition. Additionally, adoption of

[1] For example, Cole, Wesley J., et al. "Quantifying the challenge of reaching a 100% renewable energy power system for the United States." *Joule* (2021).

sustainable fuels, such as hydrogen has several technical concerns, e.g., those relating to production, storage, and NO_x emissions, due to the nascency of the technology.

5. **Explain how this topic contributes to equitable distribution of benefits to: BIPOC (Black, indigenous and people of color), environmental justice communities, equity investment eligible communities and/or equity investment eligible persons.** – Optimizing the thermal fleet can accelerate the reduction of emissions from power generation that have traditionally had a disproportionately large effect on disadvantaged communities. For example, replacement of coal, oil, and older, less efficient gas power plants with newer, more efficient gas plants can reduce greenhouse gas and criteria pollutant emissions. Further, the development of new, more efficient sources allows the state and communities to determine the best place to locate the new resources, potentially eliminating any impact on a community.

6. **Explain how this topic contributes to the long-term growth of energy efficiency, demand response, and investments in renewable energy resources.** – A well-designed portfolio of generation resources can better integrate renewable energy resources than a poorly designed one. In grids that lack supply-side flexibility, renewable energy curtailment often occurs as a result of ramping constraints from inflexible thermal resources (e.g., coal, nuclear, combined cycle). However, in grids with greater supply-side flexibility, thermal resources can quickly ramp up or ramp down their output to balance the variability of renewable resources. As such, optimizing the thermal fleet to balance renewable variability can minimize curtailment, thereby increasing the uptake of renewable energy and encouraging greater renewable energy investment. If an integrated resource planning process considers demand response and energy efficiency as methods for reducing load, utilities may be more willing to design and deploy programs to promote these investments.

7. **Explain how this topic contributes to reliability, resiliency, DER, and service quality.** – Thermal resources contribute to reliability because they provide a source of dispatchable power (i.e., they can continuously serve load, especially when renewables and storage are unavailable). Thermal resources can also promote resiliency, DER, and service quality if they have the right attributes. Specifically, operationally flexible thermal resources (e.g., ones that can start, stop, and ramp between 0 and 100 percent load within 5 minutes) can promote DER integration for the reasons described in the previous question. Thermal resources with black-start capability and are fuel-flexible (i.e., can utilize multiple fuels) contribute to resiliency and service quality. Black-start capable resources can quickly restore power when other parts of the grid experience outages. Fuel-flexible resources allow for fuel-switching when one fuel is less economic: For example, a dual-fuel engine can operate on light fuel oil when natural gas becomes prohibitively expensive (as was the case during Winter Storm Uri). Together, these attributes can reduce the duration and frequency of power outages as well as keep electricity prices affordable.

8. **Explain any expectations or suggestions about how the discussion of this topic should proceed and what outcomes are hoped for.** – A discussion on the role of the thermal generation fleet during Illinois' renewable energy transition would first benefit from an overview of the existing generation fleet and the Utilities' current plans for how these resources will evolve to meet the state's clean energy goals. This could be followed by a more technical discussion of the processes (e.g., capacity expansion or production simulation modeling) the Utilities use to develop these plans. By discussing how the Utilities plan to meet their ultimate clean energy and environmental goals for 2050, a conversation regarding the role of the thermal fleet, grid flexibility, reliability, and affordability during the clean energy transition would naturally arise. Ultimately, Wärtsilä's hope is that an informative and productive discussion can result in more comprehensive and wholistic planning processes overseen by the Illinois Commerce Commission and carried out by Ameren and ComEd. Specifically, in addition to the 5-year outlook for distribution system investments, Wärtsilä hopes that a more formal and transparent integrated resource planning process, which addresses how 2050 goals will be achieved, will be established. Although longer-term plans continuously evolve over time, deliberate planning can

inform and promotes safe, reliable, and affordable achievement of the state's energy and environmental goals.

9. **Additional Information: If not covered in Questions 1 – 8, please provide additional information on this topic, if needed.** – N/A

Sources

If any sources will be useful in reviewing proposed program designs and recommendations, please either provide links within this template or send attachment(s) to the GP Workshop Facilitator in the submittal.
For more information regarding Wärtsilä's views on the renewable energy transition, including its power system modeling studies, please review Wärtsilä's "Front Loading Net Zero" report, which is publicly available at https://www.Wartsila.com/front-loading-net-zero.